

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 047182-0122	<b>FOR FURTHER ACTION</b>	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/US03/38952	International filing date ( <i>day/month/year</i> ) 09 December 2003 (09.12.2003)	(Earliest) Priority Date ( <i>day/month/year</i> ) 09 December 2002 (09.12.2002)
Applicant RENSSELAER POLYTECHNIC INSTITUTE		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the Report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (See Box II).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. \_\_\_\_\_



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.



None of the figures

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/38952

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H01L 31/00, 31/0256, 51/00

US CL : 136/263; 257/E51.04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 136/263; 257/E51.04; 136/243-265; 257/40

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
IEEE Explore, Search terms solar/photovoltaic, nanotube

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 98/39250 (Smalley et al) 11 September 1998 (11.09.1998), Especially page 50, lines 14-30; page 30, line 18-page 33, line 20; page 35, line 1 - page 37, line 27.	1-8, 11-28, 31, 32, and 34-42
Y	US 5,084,365 A (Gratzel et al) 28 January 1992 (28.01.1992), entire document.	1-8, 11-28, 31, 32, and 34-42
Y	R. Taylor, ed. "The Chemistry of Fullerenes", World Scientific Publishers, Singapore, 1995. Especially pages 67-85 and 202-210.	7, 8, 26-28
Y	A. Arancibia et al, "Synthesis and Characterization of New Ruthenium Complexes With 11-carboxy-dipyrido (3,2-a:2',3'-c)phenazine as Ligand", Bol. Soc. Chil. Quim. 45(4), 2000, p587-592. Especially Abstract and Introduction sections.	11, 37
Y	Jana, A.K. et al, "Photoelectrochemical Cells Consisting of Phenosafranin-EDTA and Different Redox Couples with Illuminated Semiconductor Electrode", Solar Energy, 51(5) pp 313-316, entire document.	12
Y	US 6,084,176 A (Shiratsuchi et al) 4 July 2000 (04.07.2000), Especially Columns 1 and 2; Column 12, lines 58-62; Column 14, lines 7-23; Table 2, No. 29.	14-16, 19, 31, 32, 36, 39
Y	US 6,352,777 B1 (Bulovic et al) 5 March 2002 (05.03.2002), Especially embodiment of Figure 8; Column 4, lines 36-54; Column 18, lines 28-57	14, 19, 20, 31, 32, 39

☒ Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

22 April 2005 (22.04.2005)

Date of mailing of the international search report

10 MAY 2005

Name and mailing address of the ISA/US

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Form PCT/ISA/210 (second sheet) (July 1998)

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## C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,175,981 A (Loutfy et al) 27 November 1979 (27.11.1979), especially background section.	23